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A case of virilism in a female Silver Pheasant

by JAMES HARRISON

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A hen Silver-Pheasant, *Lophura nycthemera* (Linnaeus) which was hatched in the spring of 1962, and which, although in full and normal plumage of the female at the time, was seen displaying vigorously in the spring of 1964.

The display in the male of this species is characterised by the assumption of a very erect posture with the head and neck fully extended and with the wings spread and vibrating rapidly, and the character of the display shown by this individual differed in no way from that of the male. This was the first and only time when the bird was seen displaying nor was there any apparent reason for this behaviour.

On the occasion of any excitement, e.g. the presence of a cat or dog, will not infrequently provoke a display in the male.

A year later, on 6th April, 1965, the presence of male plumage characters was first noted, some black feathers appearing in the front of the neck and on the breast, and these changes progressed steadily during the rest of the spring moult and from then onwards became more and more marked, indicating that the masculinising factor was operative beyond the normal duration of the moult.

On 28th November of that year the bird first showed signs of ill-health, developing wing-droop, and appearing generally in poor condition, shortly afterwards it was seen to be limping. Some improvement was obtained by giving injections of vitamin B, when it was noted that the bird had obviously lost weight, despite the fact that it had been feeding quite well. It soon became apparent that survival was impossible, and it was, in fact, found moribund on the morning of 13th January, 1966, dying shortly afterwards.

The degree of disturbance of the secondary sexual characters which took place between the male display in April, 1964, when the plumage was that of a normal female, to the time of its death in January, 1966, can be seen in the plate (Fig. I). This shows an advanced stage of masculinisation, rather more than seen in many cases of sexual mosaicism.



Photograph by Dr. Pamela Harrison.

Fig. I. : *Lophura nycthemera* (L.) Intersex, anatomically ♀, adult, showing marked degree of male plumage.

The profound effects here in this specimen postulate a very powerful androgenising agent.

Gross morbid anatomy

The cadaver showed an extreme degree of emaciation, and in addition the presence of numerous yellowish nodules.

The main lesion, located in the right pectoral region, measured 70 mm. from its upper to the lower pole, and approximately 35 mm. across. This lesion also embraced the pectoral girdle.

Anteriorly there were two more nodules, one about half the size of the largest, situated in the pectoral muscles opposite the left knee-joint, with a smaller one just below it. The only other nodule on the ventral surface of the body was situated in the musculature of the right thigh; this measured 14 x 9 x 6 mm.

On reflecting the sternum, two plaques were found on the inner surface of the thoracic wall on a level with the heart, which with its pericardium appeared uninvolved.

Surprisingly enough there was no gross evidence that either adrenal was affected, but an obviously atrophic ovary was found, with an oviduct of a size indicating that the bird had laid eggs. This assumption is supported by observations during life, for this bird was in an enclosure with the cock and another hen, and the fact that most days an egg was gathered is clear evidence that both hens were laying.

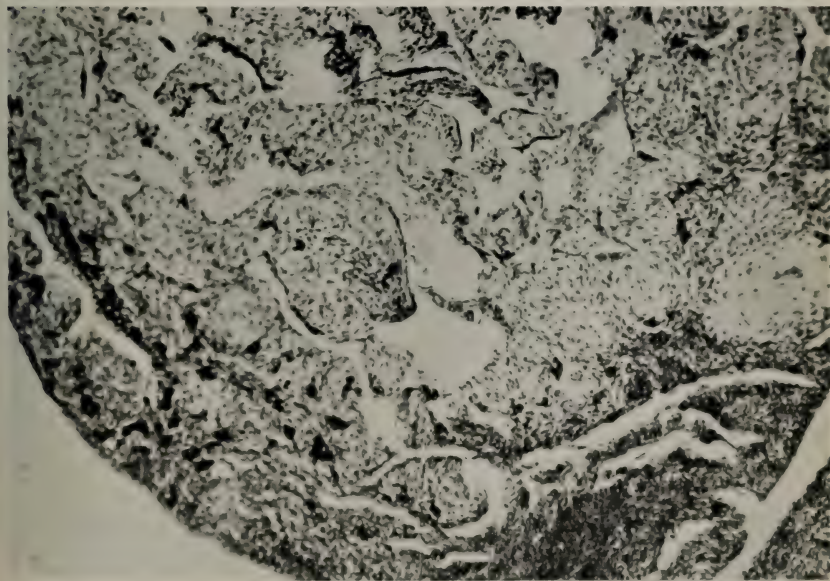
Another curious finding was that of the virtual absence of the lower third of the right kidney, although a very small piece of the extreme lower pole is visible. In the writer's opinion this anatomical defect is by nature congenital.

Microscopic anatomy

Sections were cut through the atrophic ovary and from a small part of the main nodule, and the prepared slides were stained with haematoxylin and eosin, the basic histological staining method.

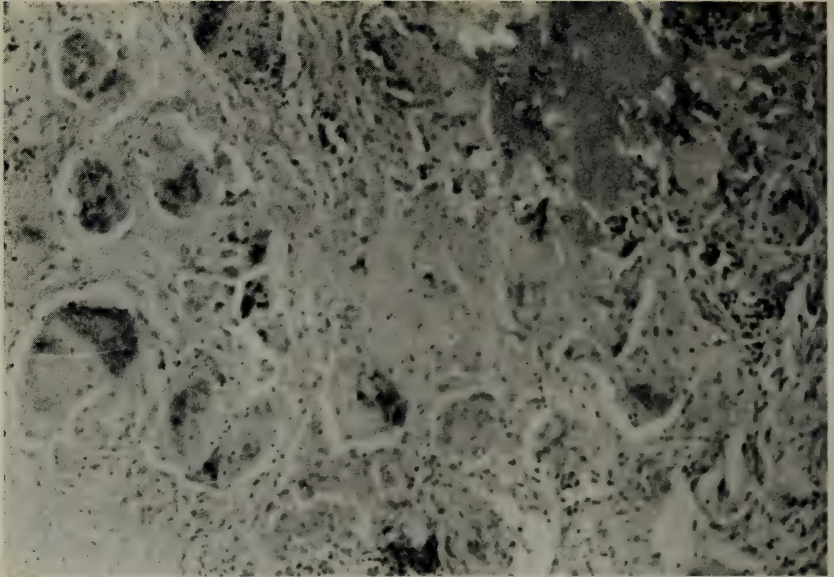
The slide of the ovary shows many degenerated cells which have failed to take up the eosin of the stain, and there are areas which lack any cell definition at all; these are in consequence almost uniform in character. Added to this picture of ovarian atrophy there is present much blackish amorphous pigment, which, in my experience is almost always found in cases of ovarian degeneration.

However, the most striking feature of the section is the invasion of the



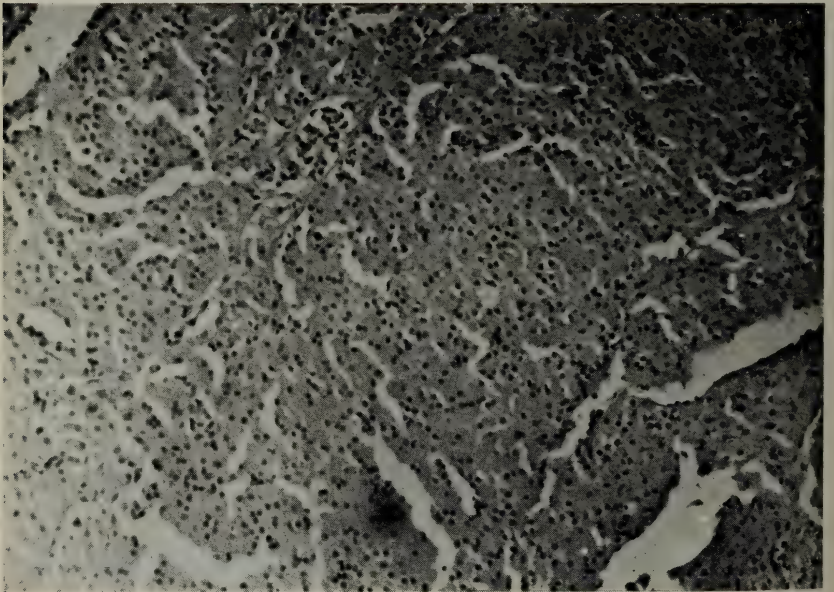
Photomicrograph by Dr. P. W. Derby.

Fig. II.: Ovary: Showing degenerated ovarian stroma and debris, and the invasion of the atrophied organ by adreneal cortical cells stained H. and E. (\times approx. 40).



Photomicrograph by Dr. P. W. Derby.

Fig. III.: Multinucleate tuberculoid granuloma (from main lesion) Stained H. and E. (\times approx. 150).



Photomicrograph by Dr. P. W. Derby.

Fig. IV.: Another field of the same lesion showing an area of cells resembling cortical adrenal cells, but no giant cell systems. Stained H. and E. (\times approx. 150).

ovarian stroma by what are almost certainly adrenal cortical cells, which would undoubtedly account for the strong androgenic characterisation shown by this specimen. (Fig. II).

The section of a part of the main nodule has presented certain anomalous features and I have sought the opinion of Dr. Keith Randall, who comments as follows: "The second section which was thought to be metastatic deposit seems to me to show a curious foreign body type of granulomatous lesion with many tuberculoid type giant cells, some with peripheral and some with central nuclei. I do not think there is any question of tuberculosis here, but at the same time I don't think this is any sort of tumour," (Figs. III and IV).

Discussion

This case represents an example of one of the less common causes of intersexuality in birds. It would seem that the intersexual state was not brought about by any single factor, and it is difficult to decide just what initiated the change.

One usual cause for the assumption of maleness in female birds can be ruled out, *viz.* that of senility, for this bird is not of such an age, and the majority of birds developing intersexuality as a result of old age are, in the writer's experience, at least twice the age of this example.

Then we have the factor of ill-health which was observed to progress over a not inconsiderable period since this bird, for most of the time it was under observation was left with the two other birds, which did not suffer in any way, which strongly suggests that there was no question of any communicable disease.

The other notable characteristic was the relatively rapid emaciation with the presence of widespread peripheral lesions. The assumption can be safely accepted that this was no acute episode but some cold and almost chronic illness, and the dissemination of the lesions adds to this somewhat puzzling clinical-pathological picture.

Probably the earliest reference to the maculinisation of female birds, due to extragonadal influences, is to be found in the paper by J. P. McGowan (1936) in which the suggestion is made and is fully discussed, as to the effects of extra-gonadal androgen secreted by the adrenal glands, a theory the substantiation of which has since been fully accepted.

A circumstance which fully supports this view is, of course, that these cases of ovarian agenesis in which very marked maleness is assumed by females of the species, in which ovulation had naturally never occurred, and in which also there was no question of the development of a right-sided compensatory ovo-testis, and in which, in the present state of our knowledge, there would be no other source of androgenic hormone.

Added to the hormone influence in such cases one must bear in mind that there may well co-exist genetic factors in the determination of maleness. Concerning this latter mechanism in female birds, we can be less certain in the present state of our knowledge, as there is no doubt that the determination of sex genetically is quite variable within the various species.

This case has presented some very puzzling features, for at the onset of the events leading up to the changes in the secondary sexual characters as described herein, the appearances of the bird at that time were entirely

those of a normal hen. The sequence of events could, at that time up to the end of November, reasonably have been ascribed to the onset of ovarian atrophy with presumably the development of a compensatory right-sided gonad.

Subsequent events however, caused one to think that the problem was actually not as simple and straightforward as this.

The onset of symptoms of progressive ill-health, lasting a matter of six weeks and four days in its terminal phase confirmed that some other factor than that of a simple failure of ovarian function and its consequences was operative.

The gross morbid anatomy has already been described and the microscopy has confirmed the state of ovarian atrophy with invasion of the degenerated ovarian stroma with adrenal cortical cells, but has added a further puzzle in that an examination of the sections of the main lesion presented the characters, as determined by Dr. Keith Randall, as a "multinucleate tuberculoid granuloma." This type of reaction is associated with the presence of a foreign body, although such was not found at autopsy, or possibly some infection that must now remain unidentified. One is left cogitating therefore as to whether the two striking features, viz. the pronounced masculinisation shown by this bird and its severe and fatal wasting illness, in this case were in effect quite unconnected and their co-existence entirely fortuitous.

SUMMARY

A case of intersexuality, believed to be due to supra-renal virilism, in a female Silver Pheasant is described and some aspects of this condition in birds is discussed in this context.

The histopathology presented certain unusual features.

ACKNOWLEDGMENTS

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To Dr. Jeffery Harrison I am, as usual, indebted for much useful discussion and comment on this and similar cases, and to Dr. Pamela Harrison for the photograph showing this remarkable specimen.

Reference:

McGowan, J. P., 1936. Supra-renal "virilism" in a Domestic Hen, its possible significance. *Quarterly Journal of Microscopical Science*. XIII, 4: 377-382.

A probable intrageneric hybrid pewee (*Tyrannidae: Contopus*) from México

by ALLAN R. PHILLIPS and LESTER L. SHORT, JR.

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A peculiar male tyrant flycatcher ("pewee") specimen obtained by W. B. Richardson on 11th May, 1897 at San Andrés, near San Cristóbal de Las Casas, Chiapas, was recently found by the senior author in a tray of